PATENT SPECIFICATION

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749,002

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COMPLETE SPECIFICATION

Improvements in or relating to Coating Compositions for Walls and Other Surfaces.

We, AEROCEM LIMITED, a British Company, of 3, Chesterfield Gardens, London, W.1, formerly of Rolands Wharf, 71, Lots Road, Chelsea, London, S.W.10, do hereby declare the invention, for which we pray that a Patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

This invention is for improvements in or relating to a method of and composition for applying insulating, fire-resisting, acid-resisting, corrosion-resisting and impermeable claddings to structures. The invention is concerned particularly with claddings which contain solid (insoluble) aggregates such as vermiculite, perlite, asbestos, glass or mineral wools and natural and synthetic fibres with or without the admixture of cementitious binding media such as portland cement, lime or plaster and with the admixture of non-cementitious binding media for example bitumen, natural or synthetic rubber latex, other forms of natural or synthetic rubbers as well as natural or synthetic resinous material (for example polyvinyl acetate) which may be used in the form of solutions or emulsions, drying oils and the like.

Such claddings have hitherto been applied to the structures by brushing or hand-trowelling and have generally defied mechanical application by spray-gun or pump owing to the insufficient fluidity of such mixes, resulting in their segregation under pressure or clogging of fluid lines, these difficulties being particularly pronounced when the solid aggregate comprises a particulate material which is shear-resistant in bulk, *i.e.* a particulate material the particles of which are of such shape that when in bulk they tend to interlock and can only rotate or slide over one another with difficulty when the bulk is subjected to shearing forces. Normal sands are substantially non-shear resistant in bulk being formed of particles which, although they may depart in shape from the pure spherical, do not differ significantly in dimensions taken in different directions. Fibrous materials on the other hand, wherein the individual fibres have axial dimensions which are large compared with their transverse dimensions, and laminar materials such as the micas, wherein the individual laminae are much smaller in thickness than in their other dimensions, exhibit shear-resistance in bulk which is substantial and which is exhibited in an extreme form in felted fibrous materials. Only a very small admixture of such solid aggregates with the said binding media was it hitherto possible to place mechanically. When a larger percentage of admixture of solid aggregates was called for, the only mechanical method hitherto known involved blowing dry aggregates from a tube while binding media was sprayed from a jet associated with the said tube in such a manner that the dry aggregates were wetted and bound together by the said binding media partly during their transit through the air, but principally where they impinged upon the structure's surface.

It is an object of the present invention to provide a cladding composition adapted for simple mechanical application.

It is another object of the present invention to provide a method of placing mechanically all such claddings with all such aggregates and binding media to the surfaces of structures, for example steel and reinforced concrete fuel tanks, steel and reinforced concrete buildings, structural steelwork, canals, pipes, reservoirs, retaining walls or jetties, as well as ships, aircraft and vehicles, efficiently, speedily and economically, allowing for any required percentage of admixture of said solid aggregates, with or without the admixture of cemetitious material and with the admixture of the said non-cemetitious binding media.

In our previous British Patent Specifications Nos. 616,907 and 652,705 we have described

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methods of applying a rendering of plaster-like material to the surfaces of structures which involve respectively aerating a plaster mix containing a stable foaming agent or adding the solid ingredient or ingredients of a plaster mix to a preformed foam produced by the aeration of water containing a stable foaming agent in an amount sufficient to provide a stable foam and intimately mixing said solid ingredient or ingredients with said foam to produce a substantially uniform dispersion therein and thereafter discharging said dispersion through a spray-gun or like spraying device.

Into this foam, cement or plaster with or without the addition of sand, or other suitable aggregates is gradually fed until the mixture has attained the required consistency, the mixture being continuously mixed, e.g. by means of an aeration device preferably of the type described in our British Patent Specification No. 695,111, until all the solids have been well and uniformly mixed with the foam, thus forming a cellular cement mix — the bulk increase varying from 5% to 200% by volume as compared with the volume which the same ingredients of the mix would have occupied in an unfoamed condition.

The inclusion of foam into the cementitious mixture not only renders it cellular but also gives the mixture the necessary fluidity enabling the mix to pass freely along the fluid line and to the nozzle of the spray-gun, where it is picked up by the air supplied to the nozzle to effect atomisation and sprayed in the same manner as paint. The foaming agent further has the effect that it retains the participles in suspension in the mix avoiding segregation under air pressure which, in the past, has prevented the successful spraying of ready-mixed plasters or cements.

The increase in volume may be readily achieved by the inclusion of foam in the mix as described in our previous British Patent Specification No. 652,705 and the proportion of foam in the mix may be varied in accordance with the volume increase desired and also in accordance with the type of mix used. Alternatively, the increase in volume may be attained by a method described in our previous British Patent Specification No. 616,907.

In accordance with the present invention there is provided a cladding composition adapted for mechanical application which comprises an aerated mixture of a solid aggregate, a non-cementitious binding medium, water and a stable foaming agent as herein defined. Although the solid aggregate may consist of sand, the cladding composition as provided according to the invention is surprisingly well adapted for mechanical application even when the solid aggregate comprises a particulate material which is shear-resistant in bulk as aforesaid and may therefore contain for example glass-wool, asbestos fibres or exfoliated vermiculite or mixtures of these materials, a proportion of sand being included if desired.

Further in accordance with the present invention there is provided a method of cladding a surface which comprises passing to said surface through a fluid conduit, a cladding composition comprising an aerated mixture as defined above and depositing said cladding composition on said surface.

It is a simple matter to provide that the aerated mixture is of such consistency that it is sufficiently fluid to be able to flow freely through a pipe line and thence through the nozzle of a spraying apparatus and yet is sufficiently self-supporting to be capable of remaining in position on the surface to which it has been applied. The actual amount of aeration required to produce such a consistency in any particular case is dependent on the precise character of the components of the mixture and is readily determinable by experiment. In most cases the amount of aeration required will be at least sufficient to increase the unaerated volume of the mixture by 20%.

The process of the present invention differs from those described in our previous British Patent Specifications in that the cementitious binder used in the said prior processes is partially or wholly omitted and replaced by the said non-cementitious binding media.

The cladding composition of the invention may be passed through a conduit by means of any suitable sludge or mud pump but we have found that the pump known under the Registered Trade Mark, "Mono Pump," is exceptionally suitable for the purpose and produces minimum compaction and de-aeration thereof. The cladding composition may also be passed through a conduit from a container in which its surface is exposed to superatmospheric gaseous pressure.

For depositing the cladding composition on to the surface from the fluid conduit any convenient delivery device may be employed. Thus the composition may be projected on to the surface through a nozzle which may if desired be in the form of a spray-gun in order to project the composition in particulate form. Alternatively the composition may be deposited on to the surface through a flattened metal tube. In this way the composition issues from the tube in the form of a flat ribbon, an arrangement which is particularly advantageous when the surface is of mesh form as in the case of surfaces formed from wire mesh, expanded metal or wire mesh provided at the junctions of the wires with electrically kilned clay crosses. The composition may also be applied by means of a mechanical trowel — that is a trowel with perforated face attached to the end of the fluid conduit through which perforation material freely passes to the face of the trowel and is then trowelled in a manner similar to conventional trowelling.

We have found that when using a spray-gun,

no matter how great a proportion of solid aggregate is used, the mix can readily be sprayed through any suitable spray-gun or like spraying apparatus operated by air pressure, provided, of course, that the orifice of the spray-gun is sufficiently large to permit of the passage of the largest of the said solid aggregates present in the mix.

The apparatus known as the "Aerocem" cellular cement spraying apparatus which is described in our previous British Patent Specification No. 652,705 (the word " Aerocem" is a Registered Trade Mark) has been found exceptionally suitable but any other suitable spraying apparatus may likewise be used. We have further discovered that the mix prepared and aerated in accordance with the method described above can be readily pumped for distances of up to 1,000 feet without segregation and loss of fluidity.

It will be understood that any foaming agent may be employed as long as it remains effective for a period of time sufficient to maintain the ingredients of the mixture substantially uniformly dispersed until they have been discharged from the spraying device; such foaming agents are herein referred to as " stable foaming agents."

In the process of spraying an aerated mixture there is normally an accompanying de-aerating thereof. The degree of de-aerating of a given mixture depends partly upon the velocity of impingement with the surface and partly upon the amount of secondary air used for atomisation in the spray-gun. By employing a low velocity and a maximum volume of secondary air, the mixture can be practically completely de-aerated. It is therefore possible by appropriately adjusting these factors, when depositing the cladding composition by spraying, to produce a cladding which is cellular or non-cellular as required, a cellular cladding being particularly advantageous where fire-resistance or thermal or acoustic insulation is required.

The following Examples which are given in order to illustrate the manner in which the invention may be carried into effect are not to be taken as limiting the scope of the invention.

EXAMPLE 1

20 pints of water and 1 pint of the foaming agent known as "Teepol" and believed to be an aqueous solution of a sodium higher secondary alkyl sulphate (the word "Teepol" is a Registered Trade Mark) were placed in an apparatus known as an " Aerocem Aeromixer" (Patent Specification No. 695,111) and converted by the said apparatus into approximately 4 cu. ft. of foam. Into that foam 30 lbs. of portland cement, 1 cu. ft. of exfoliated vermiculite and 1 cu. ft. of asbestos fibre were fed gradually and thoroughly mixed with the foam by the said apparatus. Finally, 1 gallon of a bituminous emulsion sold under the Registered Trade Mark, " Flintkote," was admixed by the said Aeromixer, turning the whole into approximately 4 cu. ft. of mix, the mix then being applied to a concrete surface by means of spraying apparatus known under the Registered Trade Mark " Aerocem."

EXAMPLE 2

20 pints of water and 1 pint of "Teepol" 7098 were placed in an "Aerocem Aeromixer" and converted by the said apparatus into approximately 4 cu. ft. of foam. Into the foam 1 cu. ft. of exfoliated vermiculite and 1 cu. ft. of asbestos fibre were fed gradually and thoroughly mixed therewith by the said apparatus. Finally 1 gallon of " Flintkote " was admixed by the said Aeromixer, turning the whole into approximately 4 cu. ft. of mix. The mix was then applied to a concrete surface by means of an "Aerocem" spraying apparatus.

EXAMPLE 3

20 pints of water and 1 pint of " Teepol " 7098 were placed in an " Aerocem Aeromixer " and converted by the said apparatus into approximately 4 cu. ft. of foam. Into that foam 2 cu. ft. of glass wool were fed gradually and thoroughly mixed therewith by the said apparatus. Finally, 1 gallon of " Flintkote " was admixed by the said Aeromixer, turning the whole into approximately 4 cu. ft. of mix. The mix was then applied to a concrete surface by means of an " Aerocem " spraying apparatus.

EXAMPLE 4

20 pints of water and 1 pint of " Teepol " 7098 were placed in an "Aerocem Aeromixer" and converted by the said apparatus into approximately 4 cu. ft. of foam. Into that foam 2 cu. ft. of glass wool were fed gradually and thoroughly mixed therewith by the said apparatus. Finally, 2 gallons of rubber latex were admixed by the said Aeromixer, turning the whole into approximately 4 cu. ft. of mix. The mix was then applied to a concrete surface by means of an " Aerocem " spraying apparatus.

EXAMPLE 5

20 pints of water and 1 pint of foaming agent sold under the Registered Trade Mark " Aphrosol" were placed in an " Aerocem Aeromixer " and converted by the said apparatus into approximately 4 cu. ft. of foam. Into that foam 2 cu. ft. of glass wool were fed gradually and thoroughly mixed therewith by the said apparatus. Finally, 2 gallons of synthetic latex were admixed by the said Aeromixer turning the whole into approximately 4 cu. ft. of mix. The mix was then applied to a concrete surface by means of an " Aerocem " spraying apparatus.

EXAMPLE 6

20 pints of water and 1 pint of " Teepol" 7098 were placed in an "Aerocem Aeromixer" and converted by the said apparatus into approximately 4 cu. ft. of foam. Into that foam 2 cu. ft. of mineral wool were fed gradually and thoroughly mixed therewith by the said apparatus. Finally, 2 gallons of syn-

thetic rubber latex were admixed by the said Aeromixer turning the whole into approximately 4 cu. ft. of mix. The mix was then applied to a concrete surface by means of an "Aerocem" spraying apparatus.

EXAMPLE 7

20 pints of water and 1 pint of "Teepol" 7098 were placed in an "Aerocem Aeromixer" and converted by the said apparatus into approximately 4 cu. ft. of foam. Into that foam 2 cu. ft. of the mineral wool known as "magnesium plastic" were gradually fed and thoroughly mixed therewith by the said apparatus. Finally, 3 gallons of bituminous emulsion were admixed by the said Aeromixer turning the whole into approximately 4 cu. ft. of mix. The mix was then applied to a concrete surface by means of an "Aerocem" spraying apparatus.

EXAMPLE 8

20 pints of water and 1 pint of "Teepol" 7098 were placed in an "Aerocem Aeromixer" and converted by the said apparatus into approximately 4 cu. ft. of foam. Into that foam 2 cu. ft. of light-weight mineral aggregate sold under the Trade Name "Perlite" were fed gradually and thoroughly mixed together by the said apparatus. Finally, 3 gallons of bituminous emulsion were admixed by the said Aeromixer, turning the whole into approximately 4 cu. ft. of mix. The mix was then applied to a concrete surface by means of an "Aerocem" spraying apparatus.

EXAMPLE 9

20 pints of water and 1 pint of "Teepol" 7098 were placed in an "Aerocem Aeromixer" and converted by the said apparatus into approximately 4 cu. ft. of foam. Into that foam 2 cu. ft. of exfoliated vermiculite were fed gradually and thoroughly mixed therewith by the said apparatus. Finally, 2 gallons of synthetic rubber latex were admixed by the said Aeromixer turning the whole into approximately 4 cu. ft. of mix; the whole being placed into a conical container at the base of which a pump, sold under the Registered Trade Mark, "Mono Pump," was attached, the ingredients being pumped horizontally by the said pump through a $1\frac{1}{2}$-inch rubber fluid line for a distance of 500 feet.

What we claim is:—

1. A cladding composition adapted for mechanical application which comprises an aerated mixture of a solid aggregate, a non-cementitious binding medium, water and a stable foaming agent as herein defined.

2. A cladding composition according to claim 1 in which the solid aggregate comprises a particulate material which is shear-resistant in bulk.

3. A cladding composition according to claim 1 or 2 in which the solid aggregate contains glass-wool, asbestos fibres or exfoliated vermiculite.

4. A cladding composition according to any one of claims 1 to 3 in which the solid aggregate contains sand.

5. A cladding composition according to any one of claims 1 to 4 containing a cementitious as well as a non-cementitious binding medium.

6. A cladding composition adapted for mechanical application substantially as hereinbefore described with reference to any one of the Examples.

7. A method of cladding a surface which comprises passing to said surface through a fluid conduit, a cladding composition according to any one of the preceding claims and depositing said cladding composition on said surface.

8. A method according to claim 7 in which the composition is projected on to the surface from the fluid conduit through a nozzle.

9. A method according to claim 7 in which the composition is deposited on said surface through a flattened metal tube.

10. A method according to claim 8 in which the composition is projected on to the surface from the fluid conduit through a spray-gun.

11. A method according to claim 9 in which the surface is of mesh-form.

12. A method of cladding a surface substantially as hereinbefore described with reference to any one of the Examples.

13. A surface when cladded by the method of any one of claims 7 to 12.

STEVENS, LANGNER, PARRY & ROLLINSON,
Chartered Patent Agents,
Agents for the Applicants.

PROVISIONAL SPECIFICATION

Improvements in or relating to Coating Compositions for Walls and Other Surfaces.

We, AEROCEM LIMITED, a British Company of Rolands Wharf, 71, Lots Road, Chelsea, London, S.W.10, do hereby declare this invention to be described in the following statement:—

This invention is for improvements in or relating to a method of applying insulating, fire-resisting, acid-resisting, corosion-resisting and impermeable claddings to structures. The invention is concerned particularly with claddings which contain solid (insoluble) aggregates such as vermiculite, perlite, asbestos, glass or mineral wools and natural and synthetic fibres with or without the admixture of cementitious binding media such as portland cement, lime or plaster and with the admixture of non-cementitious binding media for example bitumen, natural or synthetic rubber latex, other

thetic rubber latex were admixed by the said Aeromixer turning the whole into approximately 4 cu. ft. of mix. The mix was then applied to a concrete surface by means of an "Aerocem" spraying apparatus.

EXAMPLE 7

20 pints of water and 1 pint of "Teepol" 7098 were placed in an "Aerocem Aeromixer" and converted by the said apparatus into approximately 4 cu. ft. of foam. Into that foam 2 cu. ft. of the mineral wool known as "magnesium plastic" were gradually fed and thoroughly mixed therewith by the said apparatus. Finally, 3 gallons of bituminous emulsion were admixed by the said Aeromixer turning the whole into approximately 4 cu. ft. of mix. The mix was then applied to a concrete surface by means of an "Aerocem" spraying apparatus.

EXAMPLE 8

20 pints of water and 1 pint of "Teepol" 7098 were placed in an "Aerocem Aeromixer" and converted by the said apparatus into approximately 4 cu. ft. of foam. Into that foam 2 cu. ft. of light-weight mineral aggregate sold under the Trade Name "Perlite" were fed gradually and thoroughly mixed together by the said apparatus. Finally, 3 gallons of bituminous emulsion were admixed by the said Aeromixer, turning the whole into approximately 4 cu. ft. of mix. The mix was then applied to a concrete surface by means of an "Aerocem" spraying apparatus.

EXAMPLE 9

20 pints of water and 1 pint of "Teepol" 7098 were placed in an "Aerocem Aeromixer" and converted by the said apparatus into approximately 4 cu. ft. of foam. Into that foam 2 cu. ft. of exfoliated vermiculite were fed gradually and thoroughly mixed therewith by the said apparatus. Finally, 2 gallons of synthetic rubber latex were admixed by the said Aeromixer turning the whole into approximately 4 cu. ft. of mix; the whole being placed into a conical container at the base of which a pump, sold under the Registered Trade Mark, "Mono Pump," was attached, the ingredients being pumped horizontally by the said pump through a 1½-inch rubber fluid line for a distance of 500 feet.

What we claim is:—

1. A cladding composition adapted for mechanical application which comprises an aerated mixture of a solid aggregate, a non-cementitious binding medium, water and a stable foaming agent as herein defined.

2. A cladding composition according to claim 1 in which the solid aggregate comprises a particulate material which is shear-resistant in bulk.

3. A cladding composition according to claim 1 or 2 in which the solid aggregate contains glass-wool, asbestos fibres or exfoliated vermiculite.

4. A cladding composition according to any one of claims 1 to 3 in which the solid aggregate contains sand.

5. A cladding composition according to any one of claims 1 to 4 containing a cementitious as well as a non-cementitious binding medium.

6. A cladding composition adapted for mechanical application substantially as hereinbefore described with reference to any one of the Examples.

7. A method of cladding a surface which comprises passing to said surface through a fluid conduit, a cladding composition according to any one of the preceding claims and depositing said cladding composition on said surface.

8. A method according to claim 7 in which the composition is projected on to the surface from the fluid conduit through a nozzle.

9. A method according to claim 7 in which the composition is deposited on said surface through a flattened metal tube.

10. A method according to claim 8 in which the composition is projected on to the surface from the fluid conduit through a spray-gun.

11. A method according to claim 9 in which the surface is of mesh-form.

12. A method of cladding a surface substantially as hereinbefore described with reference to any one of the Examples.

13. A surface when cladded by the method of any one of claims 7 to 12.

STEVENS, LANGNER, PARRY & ROLLINSON,
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Improvements in or relating to Coating Compositions for Walls and Other Surfaces.

We, AEROCEM LIMITED, a British Company of Rolands Wharf, 71, Lots Road, Chelsea, London, S.W.10, do hereby declare this invention to be described in the following statement:—

This invention is for improvements in or relating to a method of applying insulating, fire-resisting, acid-resisting, corosion-resisting and impermeable claddings to structures. The invention is concerned particularly with claddings which contain solid (insoluble) aggregates such as vermiculite, perlite, asbestos, glass or mineral wools and natural and synthetic fibres with or without the admixture of cementitious binding media such as portland cement, lime or plaster and with the admixture of non-cementitious binding media for example bitumen, natural or synthetic rubber latex, other

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forms of natural or synthetic rubbers as well as natural or synthetic resinous materials, drying oils and the like.

Such claddings have hitherto been applied to the structures by brushing or trowelling and have generally defied mechanical application by spray-gun or pump, owing to the insufficient fluidity of such mixes, resulting in their segregation under pressure, clogging of fluid lines, etc. Only a very small admixture of such solid aggregates with the said binding media was hitherto possible to place mechanically. When a larger percentage of admixture of solid aggregates was called for, the only mechanical method hitherto known involved blowing dry aggregates from a tube while binding media was sprayed from a jet associated with the said tube in such a manner that the dry aggregates were wetted and bound together by the said binding media partly during their transit through the air, but principally where they impinged upon the structure's surface.

It is an object of the present invention to provide a method of placing mechanically all such claddings with all such aggregates and binding media to the surface of structures, for example steel and reinforced concrete fuel tanks, steel and reinforced concrete buildings, canals, reservoirs, retaining walls, jetties etc., as well as ships, aircraft and vehicles, efficiently, speedily and economically, allowing for any required percentage of admixture of said solid aggregates, with or without the admixture of cementitious material and with the admixture of the said binding media.

In our previous specifications Nos. 616,907 and 652,705 we have described a method of applying a rendering of plaster-like material to the surfaces of structures which involves adding the solid ingredient or ingredients of a plaster mix to a preformed foam produced by the aeration of water containing a stable frothing agent in an amount sufficient to provide a stable foam and intimately mixing said solid ingredient or ingredients with said foam to produce a substantially uniform dispersion therein and thereafter discharging said dispersion through a spray gun or like spraying device.

Into this foam, cement or plaster with or without the addition of sand, or other suitable aggregates is gradually fed until the mixture has attained the required consistency, the mixture being continuously mixed, e.g. by means of an aeration device preferably of the type described in our application No. 30899/49 until all the solids have been well and uniformly mixed with the foam, thus forming a cellular cement mix — the bulk increase varying from 5% to 200% by volume as compared with the volume which the same ingredients of the mix would have occupied in an unfoamed condition.

The inclusion of foam into the cementitious mixture not only renders it cellular but also give the mixture the necessary fluidity enabling the mix to pass freely along the fluid line and to the nozzle of the spray gun, where it is picked up by the air supplied to the nozzle to effect atomisation and sprayed in the same manner as paint. The frothing agent further has the effect that it retains the particles in suspension in the mix avoiding segregation under air pressure which, in the past, has prevented the successful spraying of ready-mixed plasters or cements.

The increases in volume may be readily achieved by the inclusion of foam in the mix and the proportion of foam in the mix may be varied in accordance with the volume increase desired and also in accordance with the type of mix used. Alternatively, aeration may be attained by a method described in our previous patent No. 616,907.

According to the present invention there is provided a method of applying to a surface a cladding composition containing a solid aggregate and a non-cementitious binding medium which comprises spraying said surface with an aerated mixture of said cladding composition, water and a stable frothing agent, as herein defined. It is a simple matter to provide that the aerated mixture is of such consistency that it is sufficiently fluid to be able to flow freely through a pipe line and thence through the nozzle of a spraying apparatus, and yet is sufficiently self-supporting to be capable of remaining in position on the surface to which it has been applied. The actual amount of aeration required to produce such a consistency in any particular case is dependent on the precise character of the components of the mixture and is readily determinable by experiment. In most cases the amount of aeration required will be at least sufficient to increase the unaerated volume of the mixture by 20%.

The process of the present invention differs from those described in our previous specifications in that in the process of the present invention, the cementitious admixture may be partially or wholly omitted and replaced by the said non-cementitious binding media.

We have found that when operating in accordance with the present invention, no matter how great a proportion of solid aggregate is used, the mix can readily be sprayed through any suitable spray gun or like spraying apparatus operated by air pressure, provided of course, that the orifice of the spray gun is sufficiently large to permit of the passage of the largest of the said solid aggregates present in the mix.

The apparatus known as the Aerocem cellular cement spraying apparatus which is described in our previous specification No. 652,705 has been found exceptionally suitable but any other suitable spraying apparatus may likewise be used. We have further discovered that the mix prepared and aerated in accordance with the method described above can be readily pumped for distances of up to

1,000 feet without segregation and loss of fluidity.

It will be understood that any frothing agent may be employed as long as it remains effective for a period of time sufficient to maintain the ingredients of the mixture substantially uniformly dispersed until they have been discharged from the spraying device; such frothing agents are herein referred to as " stable frothing agents."

In the process of spraying an aerated mixture there is normally an accompanying de-aerating thereof. The degree of de-aerating of a given mixture depends partly upon the velocity of impingement with the surface and partly upon the amount of secondary air used for atomisation in the spray gun. By employing a low velocity and a maximum volume of secondary air, the mixture can be practically completely de-aerated. It is therefore possible by appropriately adjusting these factors to produce a cladding which is cellular or non-cellular as required, a cellular cladding being particularly advantageous where fire-resistance or thermal or acoustic insulation is required.

The following examples which are given in order to illustrate the manner in which the invention may be carried into effect are not to be taken as limiting the scope of the invention: —

Example 1.

20 pints of water and 1 pint of the foaming agent sold under the Registered Trade Mark " Teepol " were placed in an apparatus known as an Aerocem Aeromixer (Application No. 30899/49) and converted by the said apparatus into approximately 4 cu. ft. of foam. Into that foam 30 lbs. of portland cement, 1 cu. ft. of exfoliated vermiculite and 1 cu. ft. of asbestos fibre were fed gradually and thoroughly mixed with the foam by the said apparatus. Finally, 1 gallon of a bituminous emulsion sold under the trade name of " Flintkote " was admixed by the said Aeromixer, turning the whole into approximately 4 cu. ft. of mix, the mix then being applied to a concrete surface by means of spraying apparatus known under the Registered Trade Mark of " Aerocem."

Example 2.

20 pints of water and 1 pint of the foaming agent sold under the Registered Trade Mark " Teepol " were placed in an apparatus known as an Aerocem Aeromixer (Application No. 30899/49) and converted by the said apparatus into approximately 4 cu. ft. of foam. Into that foam 1 cu. ft. of exfoliated vermiculite and 1 cu. ft. of asbestos fibre were fed gradually and thoroughly mixed therewith by the said apparatus. Finally 1 gallon of a bituminous emulsion sold under the Trade name of " Flintkote " was admixed by the said Aeromixer turning the whole into approximately 4 cu. ft. of mix. The mix was then applied to a concrete surface by means of a spraying apparatus known under the Registered Trade Mark " Aerocem."

Example 3.

20 pints of water and 1 pint of the foaming agent sold under the Registered Trade Mark " Teepol " were placed in an apparatus known as an Aerocem Aeromixer (Application No. 30899/49) and converted by the said apparatus into approximately 4 cu. ft. of foam. Into that foam 2 cu. ft. of glass wool were fed gradually and thoroughly mixed therewith by the said apparatus. Finally 1 gallon of bituminous emulsion sold under the Trade name of " Flintkote" was admixed by the said Aeromixer turning the whole into approximately 4 cu. ft. of mix. The mix was then applied to a concrete surface by means of a spraying apparatus known under the Registered Trade Mark " Aerocem."

Example 4.

20 pints of water and 1 pint of the foaming agent sold under the Registered Trade Mark " Teepol " were placed in an apparatus known as the Aerocem Aeromixer (Application No. 30899/49) and converted by the said apparatus into approximately 4 cu. ft. of foam. Into that foam 2 cu. ft. of glass wool were fed gradually and thoroughly mixed therewith by the said apparatus. Finally 2 gallons of rubber latex were admixed by the said Aeromixer turning the whole into approximately 4 cu. ft. of mix. The mix was then applied to a concrete surface by means of a spraying apparatus known under the Registered Trade Mark " Aerocem."

Example 5.

20 pints of water and 1 pint of the foaming agent sold under the trade name " Aphrosol " were placed in an apparatus known as the Aerocem Aeromixer (Application No. 30899/49) and converted by the said apparatus into approximately 4 cu. ft. of foam. Into that foam 2 cu. ft. of glass wool were fed gradually and thoroughly mixed therewith by the said apparatus. Finally 2 gallons of synthetic latex were admixed by the said Aeromixer turning the whole into approximately 4 cu. ft. of mix. The mix was then applied to a concrete surface by means of a spraying apparatus known under the Registered Trade Mark " Aerocem."

Example 6.

20 pints of water and 1 pint of the foaming agent sold under the trade name " Phomene " were placed in an apparatus known as the Aerocem Aeromixer (Application No. 30899/49) and converted by the said apparatus into approximately 4 cu. ft. of foam. Into that foam 2 cu. ft. of mineral wool were fed gradually and thoroughly mixed therewith by the said apparatus. Finally 2 gallons of synthetic rubber latex were admixed by the said Aeromixer turning the whole into approximately 4 cu. ft. of mix. The mix was then applied to a concrete surface by means of a spraying apparatus known under the Registered Trade Mark " Aerocem."

Example 7.

20 pints of water and 1 pint of the foaming

agent sold under the trade name " Phomene " were placed in an apparatus known as the Aerocem Aeromixer (Application No. 30899/49) and converted by the said apparatus into approximately 4 cu. ft. of foam. Into that foam 2 cu. ft. of magnesium plastic were gradually fed and thoroughly mixed therewith by the said apparatus. Finally 3 gallons of bituminous emulsion were admixed by the said Aeromixer turning the whole into approximately 4 cu. ft. of mix. The mix was then applied to a concrete surface by means of a spraying apparatus known under the Registered Trade Mark " Aerocem."

Example 8.

20 pints of water and 1 pint of the foaming agent sold under the trade name " Phomene " were placed in an apparatus known as the Aerocem Aeromixer (Application No. 30899/49) and converted by the said apparatus into approximately 4 cu. ft. of foam. Into that foam 2 cu. ft. of lightweight mineral aggregate sold under the trade name " Perlite " were fed gradually and thoroughly mixed together by the said apparatus. Finally 3 gallons of bituminous emulsion were admixed by the said Aeromixer turning the whole into approximately 4 cu. ft. of mix. The mix was then applied to a concrete surface by means of a spraying apparatus known under the Registered Trade Mark " Aerocem."

Example 9.

20 pints of water and 1 pint of the foaming agent sold under the trade name " Phomene " were placed in an apparatus known as the Aerocem Aeromixer (Application No. 30899/49) and converted by the said apparatus into approximately 4 cu. ft. of foam. Into that foam 2 cu. ft. of exfoliated vermiculite were fed gradually and thoroughly mixed therewith by the said apparatus. Finally 2 gallons of synthetic rubber latex were admixed by the said Aeromixer turning the whole into approximately 4 cu. ft. of mix, the whole being placed into a conical container at the base of which a pump, sold under the trade name of " Monopump " was attached, the ingredients being pumped horizontally by the said pump through a $1\frac{1}{2}''$ rubber fluid line for a distance of 500 feet.

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